

CLAIM

1. A direct current cutoff switch, comprising;

5 a first fixed contact which is formed in a prescribed inner position and is connected to a terminal unit to be connected to an external circuit;

a second fixed contact which is formed in another prescribed inner position and is connected to a terminal unit to be connected to an external circuit;

10 a movable unit with conductivity, for supporting first and second movable contacts which are disposed in positions corresponding to the first and second fixed contacts, respectively;

15 a contact pressing means for flowing direct current between the first and second fixed contacts via the first movable contact, the movable unit and the second movable contact by pressing the first and second movable contacts of the movable unit on the first and second fixed contacts, respectively;

20 a contact opening means for first separating the first movable contact pressed on the first fixed contact from the first fixed contact and then separating the second movable contact pressed on the second fixed contact from the second fixed contact; and

25 a non-linear resistor inserted and connected between

the movable unit and the first fixed contact,

said non-linear resistor has a resistance value fluctuation area indicating the minimum resistance value while inter-contact voltage shifts from 0V to the power supply voltage when large direct current between both the contacts is cut off by separating the first movable contact from the first fixed contact by a contact opening means, and after the direct current between the first and second fixed contacts is completely cut off by separating the second movable contact from the second fixed contact, the non-linear resistor is electrically separated from a contact circuit.

2. The direct current cutoff switch according to claim 1, wherein

said non-linear resistor is a positive temperature coefficient (PTC), and the contact opening voltage at the time of the cutoff of the large direct current by the opening of the first movable contact is located in the range of 28V to 48V.

3. The direct current cutoff switch according to claim 1 or 2, wherein

said PTC has a upper limit voltage in which range no thermal runaway occurs or a voltage/current

characteristic where a lower peak is in the range of 80V or more.

4. The direct current cutoff switch according to claim
5 3, wherein

said PTC has a voltage/current characteristic that the position of peak current against voltage in a range where no thermal runaway occurs is located in a range of 2V to 20V.

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5. The direct current cutoff switch according to claim
3 or 4, wherein

said external circuit is a circuit with rating of direct current 24V or a circuit for driving induction
15 load.

6. The direct current cutoff switch according to claim
4, wherein

said member movable is driven by a bi-metal, and
20 said external circuit is a charging circuit or a charging/discharging circuit of a 28V or more secondary battery pack and also is a rated circuit whose opening voltage generated by the opening of the movable contact at the time of charge or charge/discharge does not exceed
25 50V.

7. The direct current cutoff switch according to claim 6, wherein

in said PTC, Curie temperature (T_c) is set to a value higher than the operating temperature of the bi-metal.

8. The direct current cutoff switch according to claim 1, wherein

said movable member is driven by an electro-magnetic coil.

9. The direct current cutoff switch according to one of claims 1 through 8, wherein

said non-linear resistor prevents an arc generated between the first movable contact and the first fixed contact at the time of the opening of the first movable contact from continuing for two milli-seconds or more.

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10. The direct current cutoff switch according to one of claims 1 to 9, wherein

said non-linear resistor indicates a resistance value for restricting current after the first movable contact is opened to current by which an arc is not

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generated or preferably to 1A or less.

11. The direct current cutoff switch according to claim 1, wherein

5 said non-linear resistor is a PTC, and contact opening voltage which flows at the time of the cutoff of the large direct current by the opening of the movable contact is located in a range of 130V to 310V.